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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/991,498	11/14/2001	John Philip Donoghue	8790.0003-00	8186

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EXAMINER

SMITH, FANGEMONIQUE A

ART UNIT	PAPER NUMBER
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3736

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/991,498	Applicant(s) DONOGHUE ET AL.	
	Examiner Fangemonique Smith	Art Unit 3736	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/14/2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3, 7, 9-11, 13, 28, 29, 31, 32, 34, 36, 37, 42, 43 and 45-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 7, 9-11, 13, 28-29, 31-32, 34, 36-37, 42-43, and 45-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 6/14/2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/3/03, 3/9/04</u> | 6) <input checked="" type="checkbox"/> Other: <u>IDS - 7/15/05</u> |

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.
2. The information disclosure statement submitted on 3/9/04 was not considered because all of the references cited on the information disclosure statement were previously submitted and considered.

Specification

3. The abstract of the disclosure is objected to because the length of the abstract should be limited to 150 words. Correction is required. See MPEP § 608.01(b).
4. The disclosure is objected to because of the following informalities:
 - a. At line 19 of page 1, "coded n" should be replaced with -- coded in --.
 - b. At line 21 of page 3, "variable" should be replaced with -- variables --.
 - c. At line 26 of page 3, the word "between" should be removed. Further, at line 27 of page 3, "is" should be replaced with -- are --.

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- d. At line 8 of page 4, the word -- a -- should be inserted prior to the word “controller”.
 - e. At line 1 of page 22, “The hand speed” should be replaced with -- Hand speed --. Appropriate correction is required.
5. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

6. Claims 1, 10, 13 and 37 are objected to because of the following informalities:
- a. At line 7 of claim 1, the word “a” which precedes the limitation “output device” should be changed to -- an --.
 - b. At line 3 of claim 10, the limitation “motor output device” should be changed to read --output device -- to maintain consistent terminology.
 - c. At line 3 of claim 13, the limitation “motor output device” should be changed to read --output device -- to maintain consistent terminology.
 - d. At line 1 of claim 37, the limitation “the filter” should be changed to -- the control filter -- to maintain consistent terminology.
 - e. At line 2 of claim 37, the limitation “motor output device” should be changed to read -- output device -- to maintain consistent terminology.
- Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 10, 11, 13, 37, 43 and 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
4. Claims 10 and 37 recite the limitation "the least mean square error" in line 2. There is no prior recitation of this limitation in any of the claims from which claim 10 or claim 37 depend. There is insufficient antecedent basis for this limitation in the claim.
5. Claim 11 recites the limitation "error" in line 1. There is no prior recitation of this limitation in claim 11 or any of the claims from which this claim depends. There is insufficient antecedent basis for this limitation in the claim.
6. Claim 13 recites the limitation "the error" in line 3. There is no prior recitation of this limitation in claim 13 or any of the claims from which this claim depends. There is insufficient antecedent basis for this limitation in the claim.
7. Claim 43 recites the limitation "the time bin" in line 1. The limitation is unclear as to whether "the time bin" refers to only one time bin or to each of the plurality of time bins. This limitation renders the claim indefinite.
8. Claim 45 recites the limitation "the application" in line 1. There is no prior recitation of this limitation in claim 45 or any of the claims from which this claim depends. Therefore, there is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 101

9. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. Claim 3 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 3 recites, "electrodes implanted in a central nervous system".

This recites a positive relationship to the living body. However, the living body is non-statutory subject matter and cannot be positively recited. Therefore, applicant should amend the claim to recite -- electrodes adapted to be implanted in a central nervous system--.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1, 7, 9-11, 13, 28-29, 31-32, 34, 36-37, 42-43 and 45-49 are rejected under 35 U.S.C. 102(b) as being anticipated by DeVito (U.S. Patent Number 6,001,065).

In regard to claims 1, 7 and 9, DeVito discloses a system using neurological control signals to control a device. The system comprises a sensor (120), which senses electrical activity of a plurality of neurons over successive time bins. The DeVito apparatus further comprises a vector generator, which generates a neural control vector from the sensed electrical activity of the plurality of neurons over time (col. 4, lines 38-43). There is a control filter to which the neural

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control vector is applied to provide an output control signal (col 17, lines 52-54). DeVito describes an output device (920) controlled by the output control signal transmitted from the controller (150). The sensor (120) of the DeVito device comprises an array of electrical sensing elements (123, 124, 125).

In regard to claims 10, 11, 13, and 28-29, DeVito discloses a system wherein the control filter provides an error term between the output device and an intended output (col. 21, lines 48-64).

The apparatus of the DeVito patent further comprises a neural network of one or more layers, each layer having one or more nodes, wherein the neural network reduces the error between an output of the output device and an intended output (col. 21, lines 5-14). DeVito describes a system which uses real-time FFT analysis with the ability to analyze the electrical activity of neurons is sensed over 1 to 1000 time bins wherein each time bin is 1 to 1000 ms (col. 6, lines 55-67; col. 7, lines 1-36).

In regard to claims 31-32, 34, 36-37, 42-43 and 45, DeVito discloses a method for controlling a device, which comprises providing a sensor (120), having an array of electrical sensing elements (123, 124, 125), which senses electrical activity of a plurality of neurons over successive time bins. The use of the DeVito device includes generating a neural control vector from the sensed electrical activity of the plurality of neurons (col. 4, lines 38-43). A control filter is used to calculate an innerproduct between the neural control vector and the control filter to provide a control signal (col. 17, lines 52-59). Use of the DeVito device further controls an output device (920) with the control signal from the controller. The method disclosed by DeVito describes the control filter providing an error term between the output device and an intended output (col. 21, lines 48-64). DeVito further discloses a method, which uses a real-time FFT analysis. This type

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of analysis method is capable of analyzing the electrical activity of neurons is sensed over 1 to 1000 time bins wherein each time bin is 1 to 1000 ms (col. 6, lines 55-67; col. 7, lines 1-36).

13. In regard to claims 46 – 49, DeVito discloses a method of generating a control filter comprising providing a sensor sensing electrical activity of a plurality of neurons over time. The method of the DeVito patent also includes generating a neural control vector from the sensed electrical activity of the plurality of neurons and calculating filter coefficients which when applied to the neural control vector reconstructs motor control parameters (col. 17, lines 60-67; col. 18, lines 1-27). There is a calibration step included in the method disclosed by the DeVito patent which calibrates the device by tracking a stimulus moving through a workspace in at least one spatial dimension (col. 11, lines 61-67; col. 12 lines 1-2). This method further comprises calibration based on a psuedorandom-tracking task. DeVito describes a neural network, which is able to calibrate the system using previously generated filters. The neural network learns and optimizes the signals to build new filters (col. 21, lines 5-14).

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Devito (U.S. Patent Number 6,001,065) over Howard, III et al. (U.S. Patent Number, 6,128,527).

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DeVito as discussed above teaches all of the limitations of the claim but does not disclose that the electrical sensing elements of the device are implanted to be adapted within a central nervous system. Howard, III et al. disclose an apparatus comprising sensors (426) arranged to sense the electrical activity of a subject's brain over successive time bins. The sensors (426) of the Howard, III et al. device comprise an array of electrical sensing elements (220) positioned on a microelectrode, which is adapted to be implanted within a central nervous system. It would have been obvious to one having ordinary skill in the art at the time the Applicants' invention was made to substitute a headband used to detect electrical brain activity, similar to that of the DeVito patent, for an implantable microelectrode, similar to that of the Howard, III et al. device, to improve accuracy and precision of the collected information (col. 3, lines 7-13).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fangemonique Smith whose telephone number is 571-272-8160. The examiner can normally be reached on Mon - Fri 7am - 3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Max Hindenburg can be reached on 571-272-4726. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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CHARLES MARMOR
PRIMARY EXAMINER